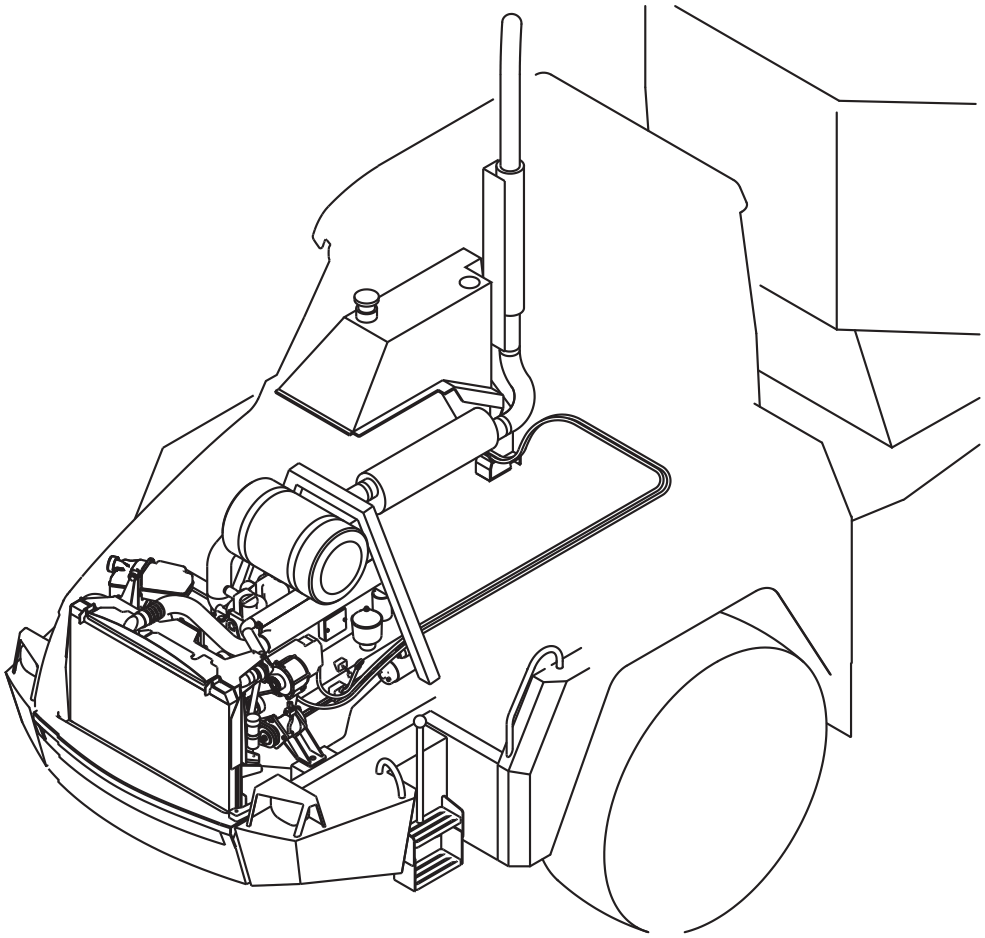
Chapter 1

Engine



Chapter 1
Engine
Index

Continuation next page

Continuation next page

Removal of engine assembly

NOTE!
Place the dump truck on level ground and apply parking brake

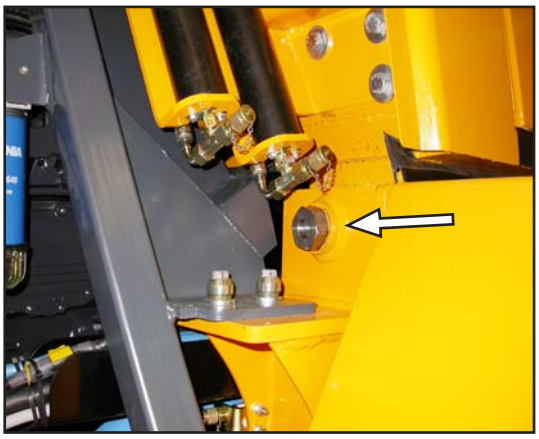
Apply articulation lock.
Turn off main switch in battery case.
Raise the dump body and lock it with the safety support.
Raise the tiltable cab and lock it with the safety support
Drain engine coolant

Look in OPERATION & MAINTENANCE MANUAL chapter 2 for instructions.

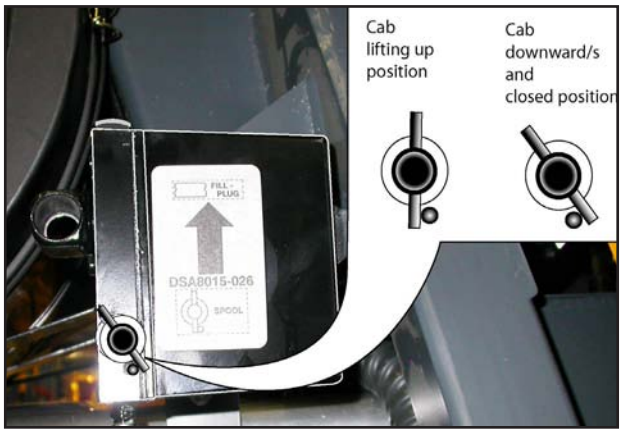
Place wheel chocks to the front wheel

Take away the cab bolt, left and right hand side.

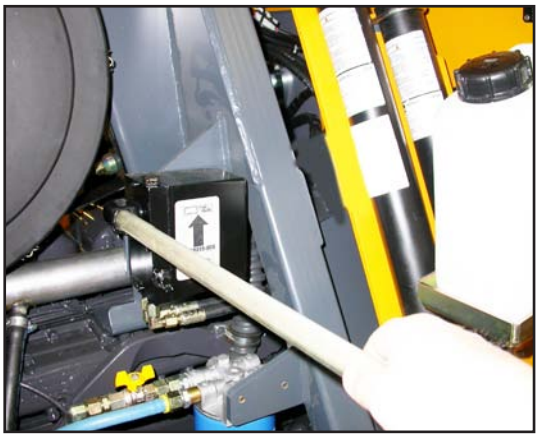
Nv 46 mm



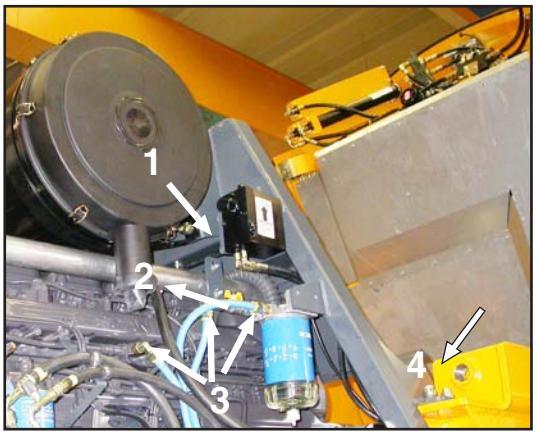
Turn the direction valve on the pump in lifting up position.



With the handle, pump and raise the cab.

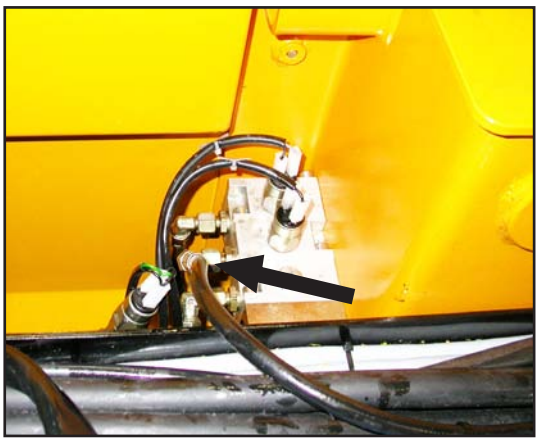


Left side:
1
Disassemble the cab pump unit from the air filter stand.
2
Remove the water hose from the pipe socket.
3
Remove the fuel hoses (3 pcs) and
4
Disassemble screws from filter stand bracket

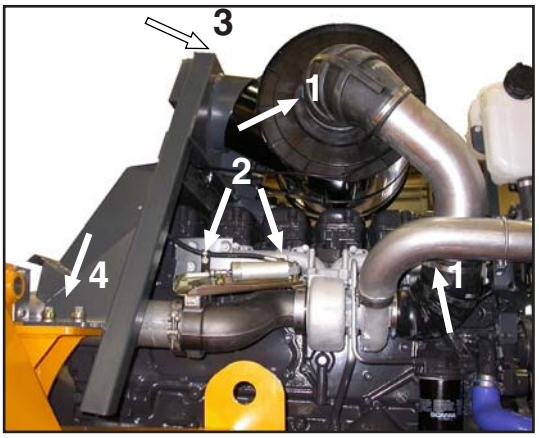


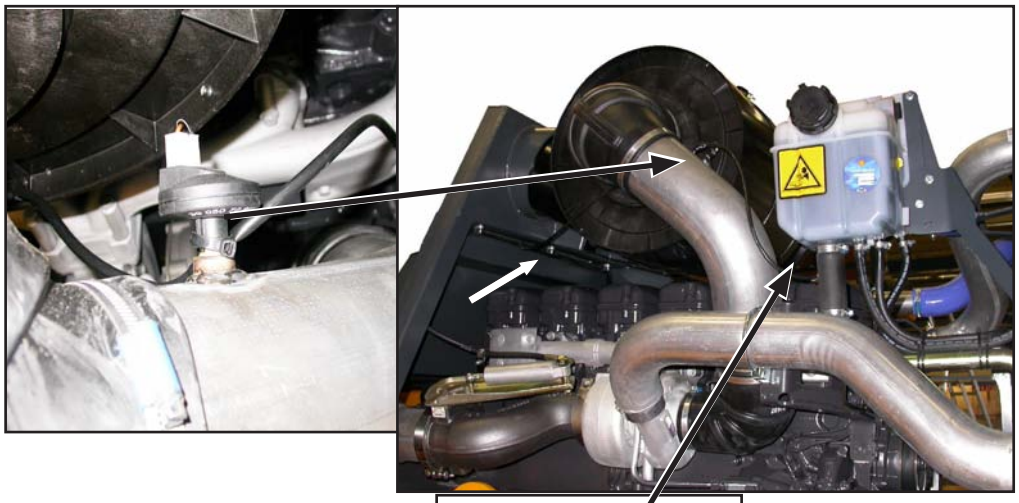
Disconnect the brake hose from the magnetic valve.

(Left side behind the cab bracket)



Right side:
1
Unscrew the hose clamps and remove the pipe bend,
filter - turbo
2
Disconnect the oil hose from engine brake cylinder and bracket
disassemble the other end at left side on the magnetic valve
3
Hook up the filter stand in lifting device.
4
Screw off the fastening bolt for filter stand,
left and right hand side

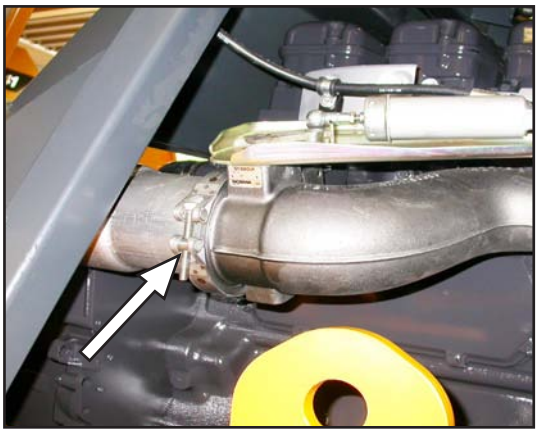




Disasssemble the cable to the Air filter sensor and cable to the sensor for the cooling water expansion tank (black arrows).

Disassemble the clamps for the wiring on the filter stand (white arrow). Remowe the wiring from the filter stand.

Disconnect the exhaust pipe from the turbo pipe bend.



Slack the transmission belt.

Disassemble the ground wiring.

Detach the Air Cond. compressor with the hoses on, from the engine. Check that all of the clamps are undone.

Place the Air condition compressor on the left while the engine is dismount.

Disconnect the hose from the termostathousing,
the pipe between the air cooler and the engine air inlet.

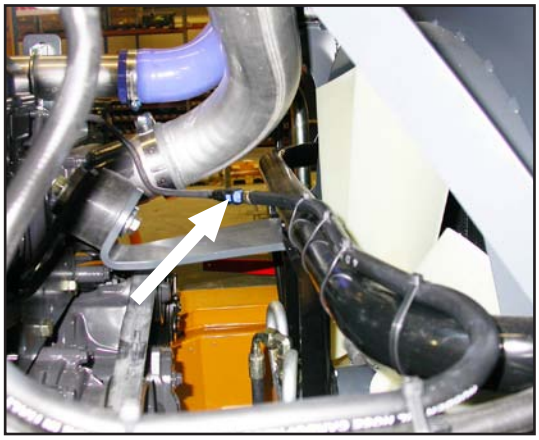
Disconnect bracket for the air pipe and bracket between engine and fan rack

Disconnect the outlet pipe bend from turbo, and the inlet water hose from the transmission cooler.

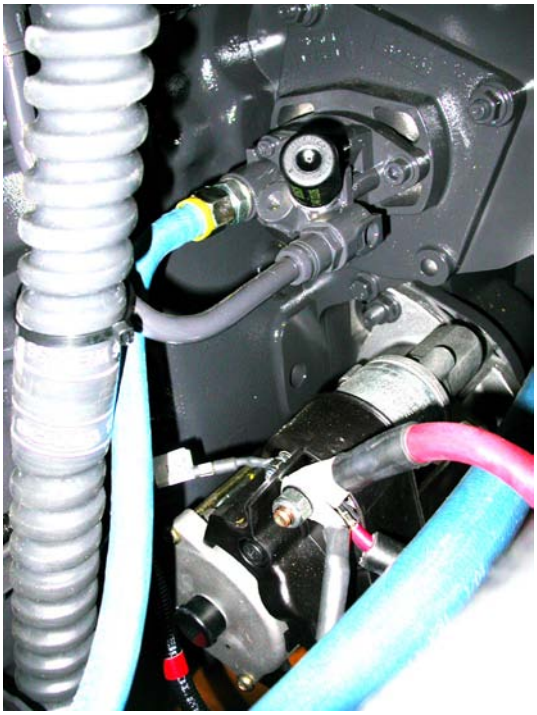
Disconnect the retur hose. (Engine - ekspantionstank)

(Quick release coupling)

(Front of the engine, view from the right hand side)

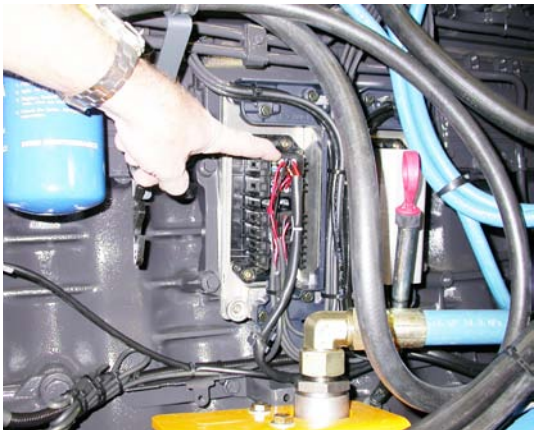


Disconnect the cables between starter motor and the frame

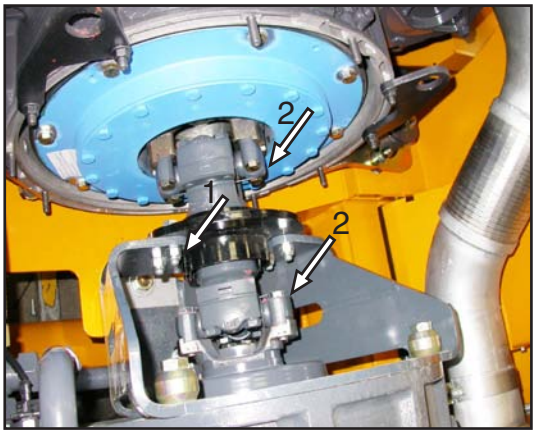


Disconnect the contact on the dynamo.

Remove the cover and disconnect the electrical contact from the engine ECU -S6 control unit

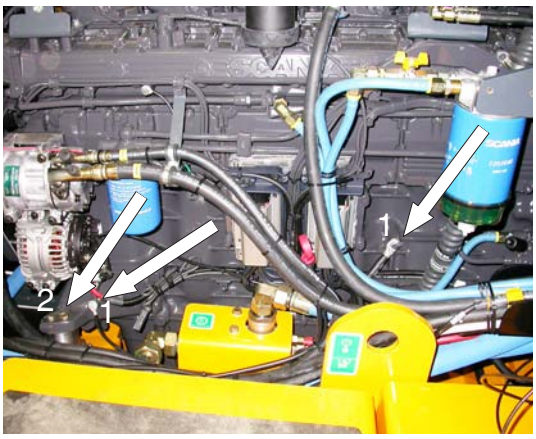


Drive shaft
Remove safety atcher.
Remove driveshaft between transmission and engine coupling,



1
Disassemble screw for the ground cable (2 pcs)

2
Left and right hand side, disassemble 3 screws on the engine mounting bracket.

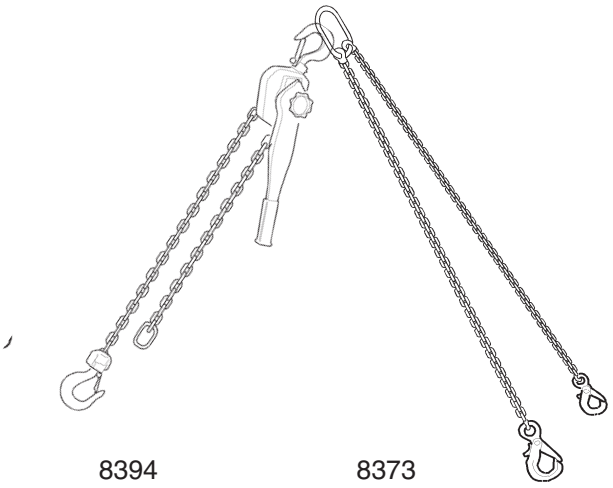


1
Disassemble the hose clamp bracket.

2
Unscrew the engine bracket bolt left and right hand side.

Lifting the engine

Note:
The engine lifting eyes are designed for lifting the engine only, not the engine together with its ancillary equipment (alternator, gearbox etc.) or fram

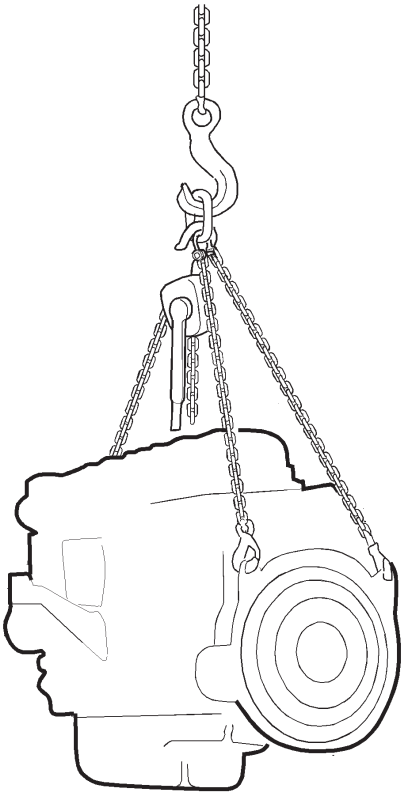


8394
Lever block

8373
Lifting chain

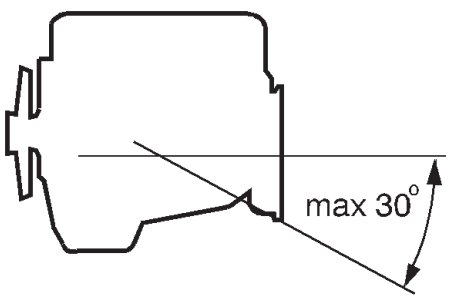
- Fasten the lifting chain 8373 to the rear lifting eyes.

- Fasten the lever block 8394 to the front lifting eye.

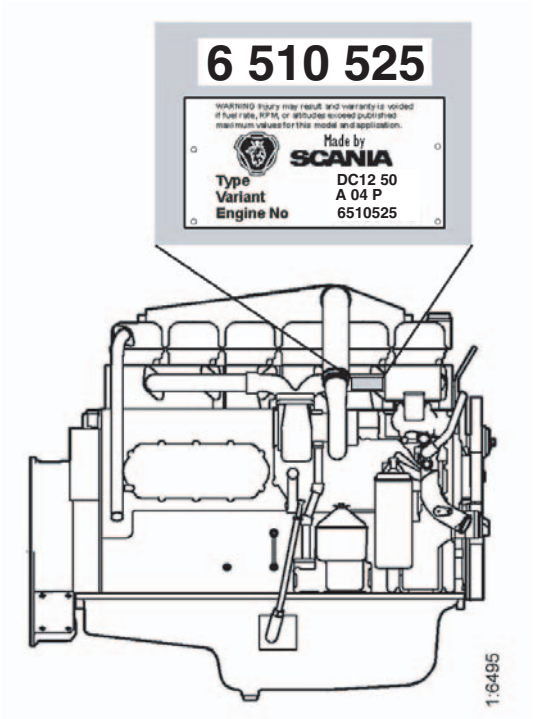


With attention, lift the engine out from the frame

Note:
The lifting eyes are sized to cope with a maximum angle of 30°.



Engine identification



The engine designation indicates, in the form of a code, the type of engine, its size and applications, etc.
The type designation and engine serial number are indicated on a type plate affixed to the right-hand side of the engine.
The engine number is also stamped on the engine block immediately above the type plate.
Refer to the illustration.

DC 12 50 A 04 P

Type

DC Supercharged diesel engine with air-cooled charge air cooler.

Displacement in whole dm^3

Performance and certification code

Indicates, together with the application code, the normal gross engine output
The actual output setting of the engine is indicated on the engine card.

Application

A For general industrial use

Variant 01-99

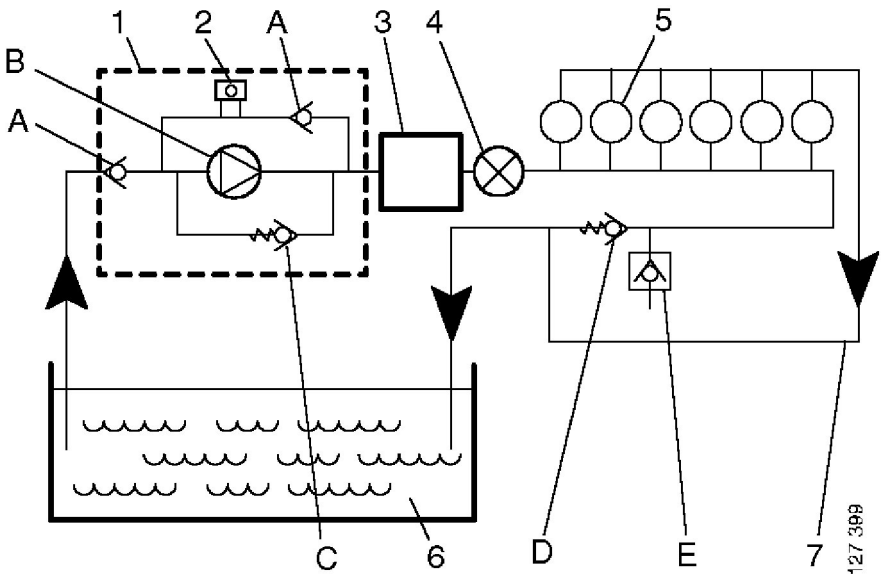
Type of regul ator

P EDC engine management system with PDE and S6

Fuel system

Schematic diagram of the fuel system

1 Feed pump
2 Hand pump
3 EMS control unit
4 Fuel filter
5 Cylinders
6 Fuel tank
7 Return line for excess fuel
A Check valve
B Gear pump (feed pump)
C Safety valve
D Pressure relief valve
E Drain nipple

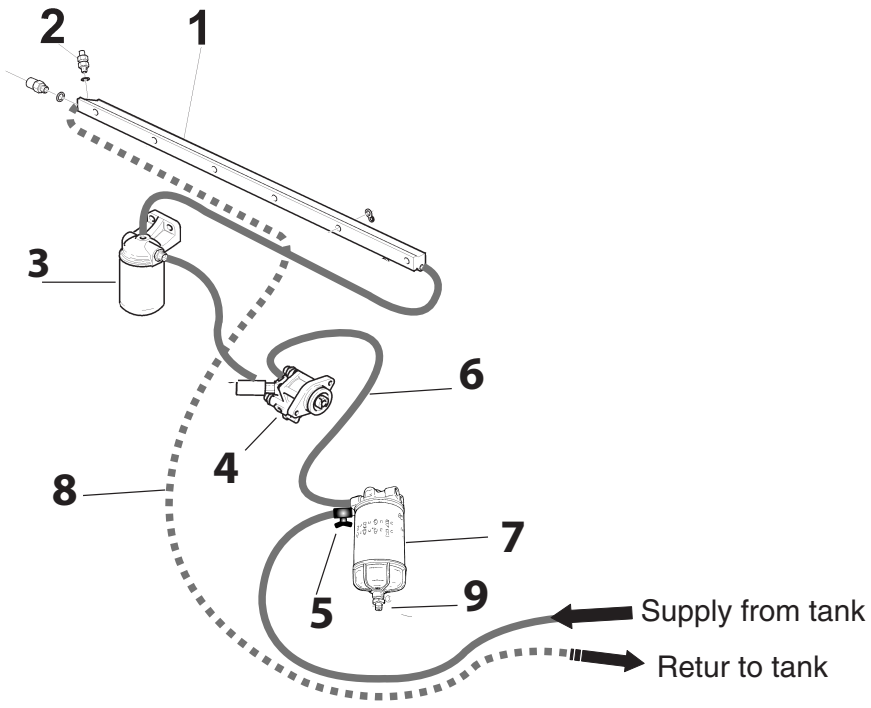


Overflow valve

The purpose of the overflow valve is to limit the pressure in the fuel system and continuously vent it. The overflow valve ensures that the fuel circulates round the system and that there is always fuel in the injection pump for cooling, lubrication and injection.

Opening pressure is **0.6 - 0.8 bar**.
Working pressure is approx. **1 bar**.

1 Fuel rail
2 Pressure relief valv
3 Fuel filter
4 Feed pump / hand pump
5 Shut-off cock
6 Oil hose water filter - feedpump
7 Water separating prefilter
8 Retur line
9 Drain valve

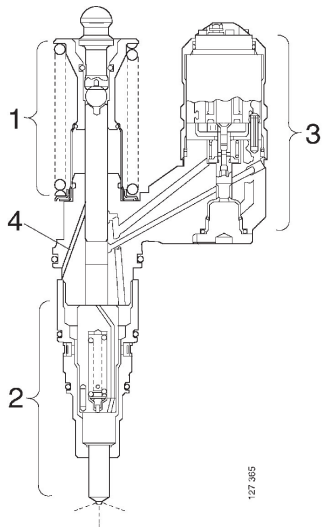


General

Apart from fuel lines and a fuel tank, a PDE (Pumpe-Düse-Einheit) fuel system with unit injectors consists of the following items:
- a feed pump
- a hand pump
- a fuel filter
- one fuel rail.
- a pressure relief valve
- One PDE type unit injector per cylinder.

The fuel system also includes an electronic control system. The control system includes an electronic control unit, the unit injector solenoid valves and sensors.

PDE



FUEL

Diesel fuel oil

The composition of the diesel fuel oil has a great influence on the functioning and the service life of the engine and the injection system.
The engine output and exhaust emissions are also dependent on the fuel quality.
The diesel fuel must meet European standard EN 590.
The table below shows the requirements for some of the most important properties:

Property	Requirement
Viscosity at 40°C	2.0 - 4.5 mm^2/s (cSt)
Density at 15°C	0.82 - 0.86 kg/dm^3
Sulphur (concentration by mass)	max. 0.3%
Ignitability (CET rating)	min. 49
Flashpoint	56°C

Environmentally favourable fuels (low sulphur fuels)

There are three classes of so called environmentally favourable fuels (SS15 54 35).

Class 1 is sulphur-free and class 2 is low in sulphur. Compared with class 3 (normal fuel), these fuels are less dense and this reduces engine power output.

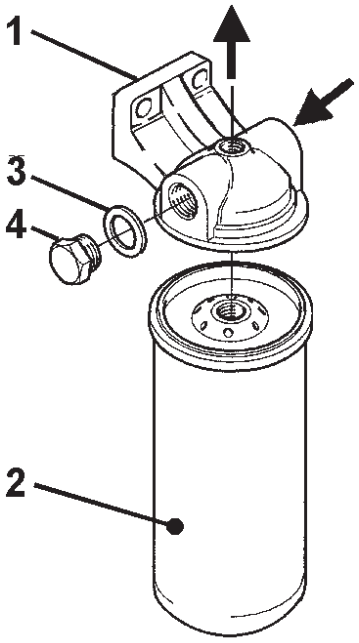
Fuel filter

Design
Fuel filter are of single-mounted type. The filter screw on to a retainer which is bolted to the engine.

The filter consists of a metal container with a folded paper element. The filter cannot be dismantled but must be changed as a complete unit.

The fuel filter has no bleed screw and is bled by undoing plug **4** in the free inlet passage.

Function
Fuel is pumped into the inlet by the fuel pump. It then continues through passages in the filter retainer to the upper part of the filter, down through the filter or filters and on to the outlet passage. From there, the fuel is piped to the injection pump.



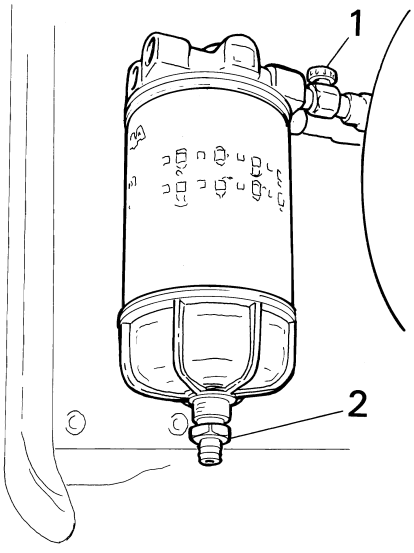
1. Filter retainer
2. Filter
3. Gasket
4. Plug

Fuel filter, constituent parts

Water separating prefilter

Note:
Close the shut-off cock when renewing the filter.

The same intervals between changes apply as for those for an ordinary fuel filter.



1 Shut-off cock
2 Drain valve

Temperature dependence of diesel fuel

At temperatures lower than those specified for the diesel fuel, paraffin wax may precipitate from the fuel and block filters and pipes. The engine can then loose power or stop. The diesel fuel is adapted for use in the specific climate of each country. If a vehicle or an engine is to be operated in a temperature zone with lower temperature than normal, first identify the temperature properties of the fuel concerned.

The properties of the fuel when cold can be improved by adopting one of the following measures before the temperature drops:

- If the fuel concerned cannot cope with the expected temperatures, and diesel fuel is not available with the correct temperature properties, we recommend that an electric fuel heater is installed **as a preventative measure.**

- The low temperature properties of diesel fuel may be improved by adding kerosene **as a preventative measure.** A maximum of 20% may be added. When refuelling, the kerosene should be added first, so that it mixes thoroughly with the diesel fuel.

Note:
It is prohibited to use kerosene in engine fuel in some countries.

- To prevent water in the fuel from freezing and forming ice, a maximum of 0.5-2% alcohol (isopropanol) may be added.

Drain fuel tanks and drain or change fuel filters regularly.

Warning

It is not permitted to mix kerosene with diesel fuel that is already adapted for the climate concerned. This can damage the
PDE injectors. All use of paraffin other than kerosene is forbidden, as it causes engine damage.

! Important

It is not permissible to mix petrol with diesel fuel. In the long term, petrol may cause wear to the PDE injectors and it may also cause damage to the **engine.**

Feed pump

The feed pump 1 draws fuel from the fuel tank and forces it through the fuel filter 3 and into the fuel rail 4.

On the feed pump there is a hand pump 2.
The hand pump is used to vent air from the fuel system.

On the fuel rail there is a pressure relief valve 5.
The pressure relief valve constantly regulates the fuel pressure. When the pressure is too high, the pressure relief valve opens, so that the excess fuel is returned to the fuel tank.

The fuel rail distributes the fuel to the unit injectors in each cylinder head.

The ECU control unit determines when the unit injectors must inject fuel into the cylinders.

Feed pump renewal

1
Clean the outside of the feed pump.
Remove the suction and pressure lines from the feed pump.
Fit protective plugs.

2
Unscrew the bolts and remove the feed pump.

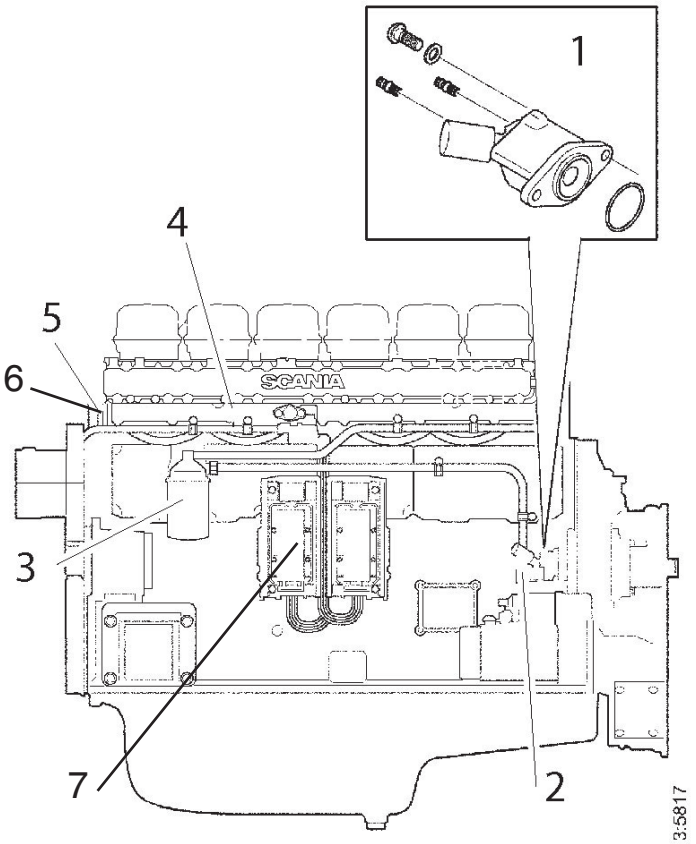
3
Place a new O-ring onto the feed pump and lubricate with O-ring grease.

4
Fit the feed pump.

5
Connect the suction and pressure pipes.

6
Bleed the fuel system; refer to *Bleeding the fuel system*.

7
Start the engine and check for leaks.



1 Feed pump
2 Hand pump
3 Fuel filter
4 Fuel rail
5 Pressure relief valve
6 Bleeder nipple
7 ECU control unit

Diagnostic prosedure

Use of diagnostic kit, machine 810001 - 810052

Install the VCI (ECOM programming unit)
Moxy No.513376

1. Switch on the laptop.

2. Connect the cabel end (2) to the CANbus connection in the cab wall.

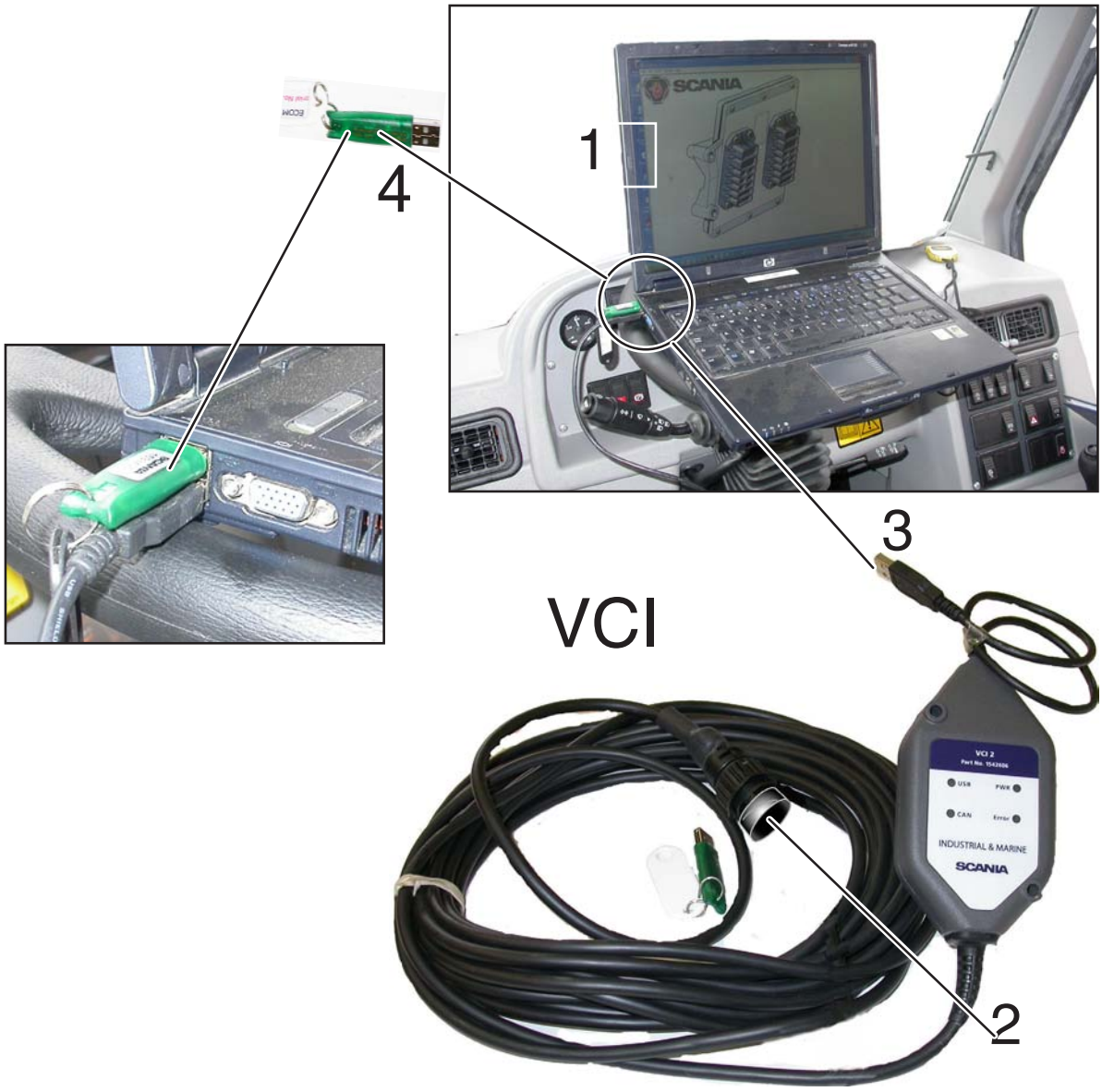
3. Connect the USB plug (3) to the Laptop

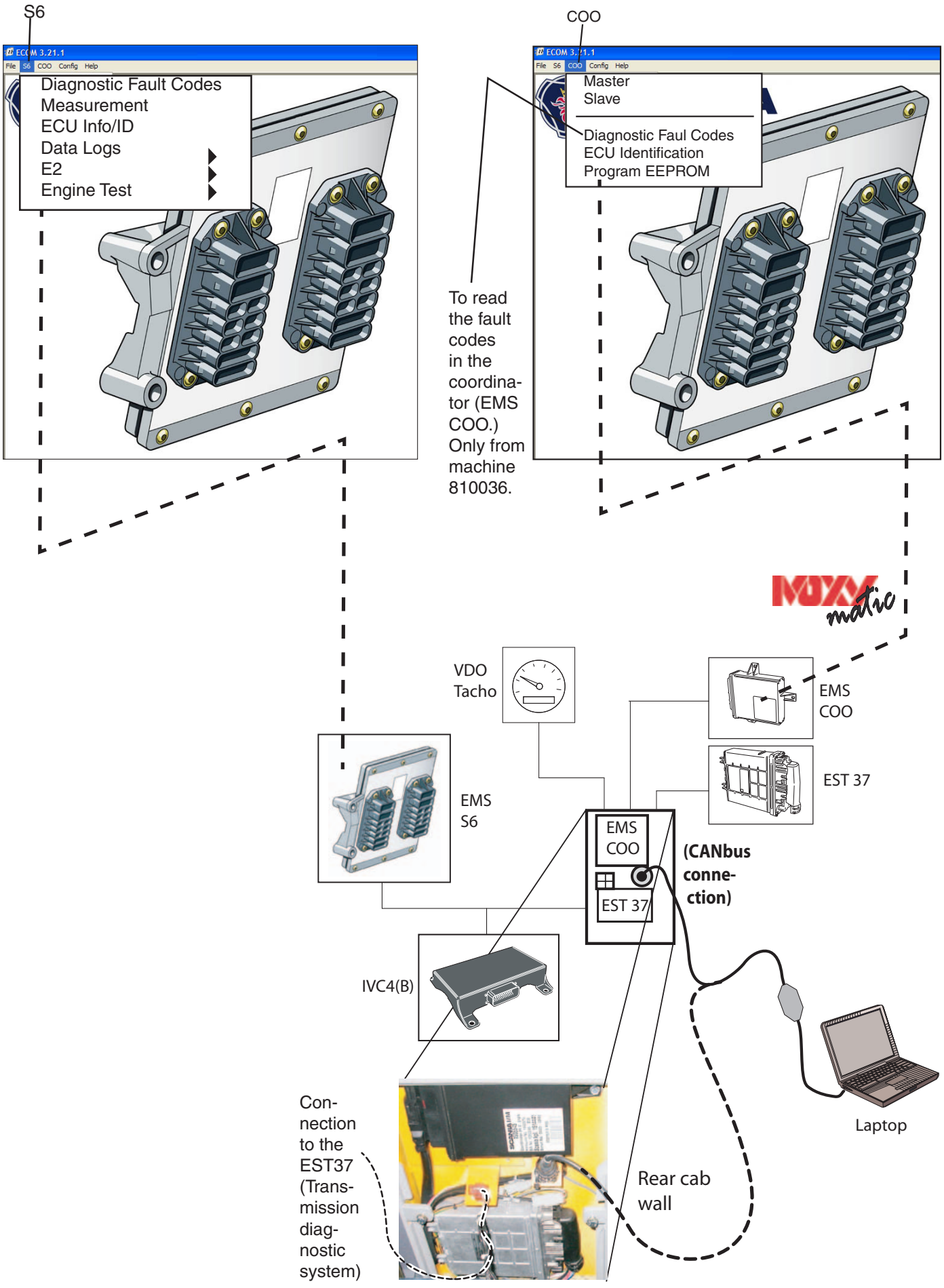
4. Put in the USB key

5. Switch on the ignition key (If read the setting parameters)

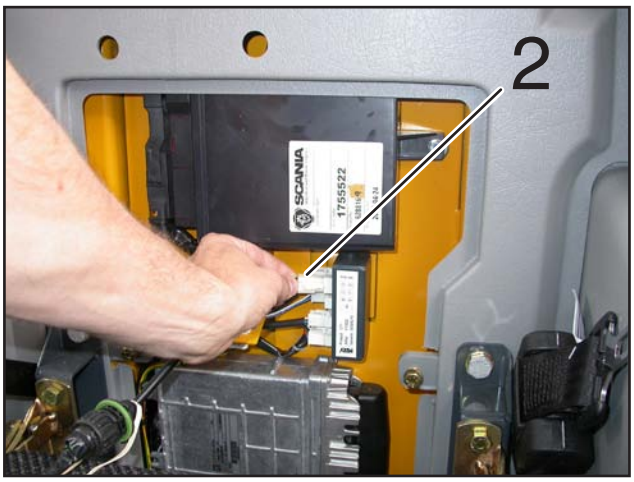
6. Start the engine. (If controlling of the parameters)

7. Start on laptop the engine ECOM program.




S6
COO
ECOM 3.21.1
File S6 COO Config Help
Diagnostic Fault Codes
Measurement
ECU Info/ID
Data Logs
E2
Engine Test
Master
Slave
Diagnostic Faul Codes
ECU Identification
Program EEPROM
To read the fault codes in the coordinator (EMS COO.) Only from machine 810036.
VDO Tacho
EMS COO
EST 37
EMS S6
EMS COO
EST 37
(CANbus connection)
IVC4(B)
Laptop
Connection to the EST37 (Transmission diagnostic system)
Rear cab wall

Use of diagnostic kit, machine 810053 -



Install the VCI (ECOM programming unit) Moxy No.513376

1. Switch on the laptop.

2. Connect the cabel end (1) to the CT1 unit

3. Connect the USB plug (2) to the Laptop

4. Put in the USB key

5. Switch on the ignition key (If read the setting parameters)

6. Start the engine. (If controlling of the parameters)

7. Start on Laptop the engine ECOM program